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## SOME NORTH AMERICAN CHELIFERID PSEUDOSCORPIONS

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This paper is concerned with the results of a study of some North American cheliferid pseudoscorpions of the tribe Cheliferini. While the present investigation is based chiefly upon materials deposited in the American Museum of Natural History, there are included numerous records of pseudoscorpions from collections submitted for determination by numerous individuals and institutions.

SUBORDER MONOSPHYRONIDA J. C. CHAMBERLIN

FAMILY **CHELIFERIDAE** HAGEN

TRIBE **CHELIFERINI** J. C. CHAMBERLIN

**Chelifer cancroides** (Linnaeus, 1758)

*Acarus cancroides* LINNAEUS, 1758, *Systema naturae*, ed. 10, p. 616.

*Chelifer cancroides* BEIER, 1932, *Das Tierreich*, vol. 58, p. 235.

RECORDS: Forest Hills and Castleton Corners, Long Island, New York; Cumberland and College Park, Maryland; Rock Point, Douglas Lake, and Midland, Michigan; Rockford and Rutland, Illinois; Gainesville, Georgia; La Mesa, Dawson County, Texas; Lawrence, Kansas; Council Bluff and Newcastle, Nebraska; Fort Collins, Colorado; Independence Rock, Sweetwater River, Wyoming; Hamilton, Ravalli County, Montana; Montpelier, Idaho; Utah Lake, Utah; Britcher collection, California; Rogue River Valley and Nestsucca River, Oregon; Salmon

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Arm, Vancouver, Bella Caola, and Kamloops, British Columbia, Canada; Wrangell and Fairbanks, Alaska. Most of the records are from dwelling houses, a few from chicken houses. An interesting record is one from Nestsucca River, Oregon, where one male and four females were taken on June 10, 1938, by Jellison and Kohls from an eve swallow nest. The specimens from Nestsucca River are deposited at the Microbiological Institute (AP No. 14095) of the United States Public Health Service, Hamilton, Montana.

***Parachelifer persimilis* (Banks, 1909)**

*Chelififer persimilis* BANKS, 1909, Canadian Ent., vol. 41, p. 304.

*Parachelifer persimilis* CHAMBERLIN, 1932, Canadian Ent., vol. 64, p. 19; 1934, Pan-Pacific Ent., vol. 10, pp. 131, 132.

RECORDS: Numerous males and females from Santa Catalina Mountains, Mormon Lake, Santa Rita Mountains, White Mountains, and Graham Mountain, Arizona, all belonging in the collections of the American Museum of Natural History; numerous males, females, and nymphs from Colorado, including a collection from Colorado Springs by E. V. Gregg, one from Ward in Boulder County by C. L. Remington, one from Fort Collins by C. C. Hoff, one from Red Feather Lakes by Ralph Hill, one collection from Ouray, and another collection marked only "Colo."; one collection, consisting of a single male, taken by M. H. Muma from beneath a stone in Chadron State Park, Nebraska; one collection taken by Lieut. D. J. Zinn at Warm Springs Ranch, Las Vegas, Nevada; one male taken from a cerambycid beetle by W. L. Jellison of the United States Public Health Service at Hamilton, Montana; one female taken by G. F. Knowlton at Vernon, Utah; one male and one female taken by W. J. Gertsch 6 miles northeast of El Salto, Durango, Mexico, on August 10, 1947, and another collection consisting of two males taken by the same person at Catarinas, Chihuahua, Mexico, on July 25, 1947.

REMARKS: Previous to this time, this species appears to have been reported only from New Mexico (Banks, 1909; Chamberlin, 1934). The species at present is poorly defined in the literature, and it is possible that a slightly different concept may be necessary after the cotypes deposited by Banks at the Museum of Comparative Zoölogy, Harvard College, have been restudied. The species as conceived by the present writer shows a wide variation in size,

but this may be correlated with the extensive geographical range of the form. Ecologically the species appears to be confined to mountainous areas. In lieu of a complete description, the following combination of characteristics has been used in making a separation of *P. persimilis* from other described species of the same genus: eyes present; palpal tibia conspicuously shorter than the femur; femur more than 1.1 mm. in length, length:width ratio less than 5.6; tibia longer than 0.9 mm. and with a length:width ratio more than 3.5 and less than 4.1; chela without the pedicle over 1.6 mm. in length, length:width ratio more than 3.5.

***Idiochelifer nigripalpus* (Ewing, 1911)**

*Chelifer cancroides* var. *nigripalpus* EWING, 1911, Jour. New York Ent. Soc., vol. 19, pp. 73, 80.

*Idiochelifer nigripalpus* CHAMBERLIN, 1932, Canadian Ent., vol. 64, p. 19. HOFF, 1946, Amer. Mus. Novitates, no. 1318, pp. 26-28.

*Hysterochelifer longidactylus* HOFF, 1945, Amer. Midland Nat., vol. 34, pp. 511-515.

RECORDS: One male from Hollister, Missouri, collected by Mrs. Vitae Kite on June 5, 1938; two males and one protonymph from beneath pine bark, Kimball Lake, Minong, Wisconsin, by H. H. Ross, August 25, 1945; one female from beneath maple bark by Lewis J. Stannard at Mahomet, Illinois, on October 23, 1948; one male and one female from beneath hemlock bark at Turkey Run State Park, Indiana, by Becker *et al.*, April 25, 1948; and one male from beneath hemlock bark by Sanderson and Stannard at the location and date immediately above. All these records are based on collections of the Illinois State Natural History Survey, Urbana, Illinois.

REMARKS: The specimens from Indiana indicate that there is considerable variation in the palpal podomeres, both as to actual size and with respect to the length:width ratios. In spite of this variation, however, it is very apparent that the present specimens are conspecific with the type specimens of the species.

In order to record the variation found in the specimens from Indiana, it seems advisable to give the following measurements. One male has a femur 0.81 mm. long, 0.175 mm. wide; tibia 0.65 mm. long, 0.20 mm. wide; chela 1.30 mm. long, 0.295 mm. wide; length of hand of chela without pedicle 0.59 mm., depth of hand 0.275 mm.; length of movable finger 0.71 mm. The other male from Indiana has the femur 0.76 mm. in length, about 0.155

mm. in width; tibia 0.64 mm. long, 0.18 mm. wide; chela 1.22 mm. long, 0.27 mm. wide; length of hand 0.59 mm., depth 0.245 mm.; movable finger 0.69 mm. in length. The female has one palpal femur 0.82 mm. long, 0.18 mm. wide, while the other femur measures 0.80 mm. long, 0.175 mm. wide; tibia of one side 0.67 mm. long, 0.21 mm. wide; the tibia of the other side 0.66 mm. in length, 0.20 mm. in width; chela 1.33 mm. long, 0.315 mm. wide; hand length 0.60 mm., depth 0.29 mm.; finger length 0.76 mm.

### **Haplochelifer philipi** (Chamberlin, 1923)

*Chelifer philipi* CHAMBERLIN, 1923, Proc. California Acad. Sci., ser. 4, vol. 12, p. 374.

*Haplochelifer philipi* CHAMBERLIN, 1932, Canadian Ent., vol. 64, pp. 17, 18, 20.

RECORDS: Three males and 19 females taken by Willis J. Gertsch on May 9, 1929, at Mill Creek Canyon, Mill Creek, Utah; one female, Richfield, Utah, August 1, 1930, and one female, City Creek Canyon, Utah, June 8, 1928, by Willis J. Gertsch; one male, Yosemite National Park, California, July, 1939, by Ernst Mayr; two females, Estes Park, Colorado, at 7500 feet, July 5, 1913, collector unknown; one male under rocks in yellow pine forest, Fort Collins Recreation Area, Roosevelt National Forest, date not given, and one male from debris in yellow pine forest, elevation 6600 feet, Rist Canyon, Roosevelt National Forest, Colorado, on September 15, 1946, by C. Clayton Hoff; and one male from litter under pinyon pines by C. Clayton Hoff near Owl Canyon, north of Fort Collins, Colorado, on November 29, 1946.

### **Hysterochelifer proprius**, new species

Figures 1-5

MALE: Description is based on the holotype and one male paratype; each measurement of the holotype is followed in parentheses by the corresponding measurement of the paratype. Body deep golden brown in color; legs slightly lighter in color; palpi a deeper reddish brown. Body fairly stout, length 3.25 (3.3) mm. Carapace coarsely granular with numerous larger setae-bearing tubercles scattered over the surface; setae very short, subclavate; posterolateral corners bearing keels similar to those of the tergites; lateral margins anterior to the keel evenly convex, anteriorly the carapace is somewhat truncate between the



eyes; posterior carapacial margin with eight to 10 setae exclusive of setae on the keel; carapace widest across the posterior margin; 0.95 (0.93) mm. long, 1.03 (0.98) mm. wide; ocular breadth 0.47 (0.49) mm. Abdomen with tergites colored and sculptured much as the carapace; all tergites divided; tergites 1 through 10 with lateral keels, those of the anterior tergites very conspicuous and with well-developed, posteriorly directed projections, those of the posteriormost tergites becoming less conspicuous until in the tenth tergite there is no noticeable projection although the sclerotic keel is present; setae stout, subclavate, and almost cylindrical, short in the anterior tergites but becoming longer in the posterior tergites; most tergal halves with eight or nine marginal setae, including one on the keel, and in addition a median and a lateral seta anterior to those of the row. The holotype shows an anomaly with respect to the regularity of the tergites, the third tergal half of the right side being on a level with and joining medially the second tergite of the left side, leaving the second tergite of the right side somewhat wedge-shaped; the fourth half-tergite of the right side is joined medially by both the third and fourth left tergal halves. Sternites of about the same color as the tergites but a little less coarsely granulate; sternites divided; setae acuminate, little longer than those of the tergites; each half of sternite 4 with nine setae, all in a marginal row; other sternal halves usually with eight to 11 setae in a posterior marginal row and in addition usually a lateral seta in each tergal half; anterior stigmatic plates without setae, each posterior plate with one seta; pleural membranes somewhat irregularly, but finely, striated; abdomen 2.3 (2.35) mm. long, 1.44 (1.45) mm. wide.

Chelicera light golden brown in color; in general fairly stout but fingers relatively less stout; palm of hand with weak, net-like markings; setae of flagellum almost entire, slender, the shortest more than one-half as long as the longest; tactile seta SB and B subterminally denticulate, other tactile setae much longer and acuminate; length of chelicera 0.255 (0.25) mm., width of hand 0.148 (0.14) mm. Fixed cheliceral finger slender, little curved; inner surface of apical tooth with three small denticles; three retroconical denticles along the anterior end of the inner finger margin; lamina exterior wide with free margin well curved. Movable cheliceral finger gently curved; serrula exterior of 17 or 18 plates; outer finger surface sculptured in such a way that in profile it appears weakly but definitely serrate; inner margin

with a single very poorly developed denticle removed some distance from the apical tooth; subterminal lobe poorly developed and very inconspicuous; laminal seta inserted near the level of the denticle and reaching to about the tip of the galea; apical tooth well curved, terminally blunt and with a weak subdivision into cusps; galea stout, gradually narrowed distally, little curved, with five or six subterminal and terminal rami; length of movable finger 0.205 (0.20) mm.

Palpus (fig. 1) dark reddish brown in color; surfaces of podomeres densely granulate, with surface of trochanter and femur characterized by numerous seta-bearing tubercles, these especially conspicuous along the flexor margin; surface of chelal fingers smooth; setae short and inconspicuous, weakly subclavate in the proximal podomeres except the maxilla, becoming virtually acuminate on the distal podomeres; setae of maxilla acuminate. Maxilla subtriangular in shape, two subapical setae on each; a conspicuous lyrifissure near the center of the inner margin of each maxilla, length of maxilla 0.49 (0.49) mm., width 0.30 (0.32) mm. Trochanter with a conspicuous subdorsal protuberance; setae-bearing tubercles very conspicuous; pedicle wider than long; inner margin of trochanter evenly convex; length 0.51 (0.51) mm., width 0.28 (0.28) mm. Femur with poorly defined pedicle, little wider than long; flexor margin a very little concave; extensor margin flatly convex in the center, more convex near each end; femur widest at about the distal one-fifth; length 1.05 (1.04) mm., width 0.24 (0.24) mm. Tibia without seta-bearing tubercles; pedicle about as long as wide; flexor margin weakly convex, fairly well differentiated from the pedicle; extensor margin flatly convex in the central half, more convex in the region of the pedicle and the distal fourth; length 0.92 (0.86) mm., width 0.29 (0.285) mm. Chela from dorsad with both margins of hand very little convex except near basal and proximal ends; pedicle near center of base of hand; hand tapered a little towards the finger base; fingers moderately slender, gently curved; length of chela 1.50 (1.44) mm., width of hand 0.39 (0.39) mm. Chela in lateral view (fig. 2) with hand subcylindrical, both ventral and dorsal margins evenly but weakly convex; base of hand more or less symmetrical with pedicle displaced a little towards the ventral side; fingers little curved; hand 0.805 (0.81) mm. in length, holotype with hand 0.355 mm. deep; finger length 0.75 (about 0.72) mm. Movable chelal finger of holotype with 42

marginal teeth, all cusp bearing and a little retroconical; fixed finger of holotype with 41 similar teeth; teeth of both fingers distinctly worn, apparently from use; condition of the hand of the paratype precludes counting of the teeth. Sensory or tactile setae as shown in figure 2.

Legs golden yellow in color, the basal podomeres often a little darker than the distal; basal podomeres moderately granulate to strongly granulate, distal podomeres less granular; setae for the most part short, stubby, and paucidenticulate, but with a tendency to become acuminate on the flexor surface of the distal podomeres, setae of the extensor surface of the femoral parts of both first and fourth legs and the tibia of the first leg are inserted on tubercles, these latter more weakly developed than on the carapace. First leg of male with distal podomeres strongly modified; trochanter 0.21 (0.21) mm. long, 0.16 (0.155) mm. deep; pars basalis with a well-defined pedicle that is much deeper than long, flexor margin of pars basalis evenly and markedly convex, length 0.34 (0.33) mm., depth 0.195 (0.19) mm.; pars tibialis fusiform, both extensor and flexor margins conspicuously convex, length 0.43 (0.42) mm., depth 0.175 (0.17) mm.; tibia somewhat pediculate, extensor margin somewhat convex in the basal two-thirds or three-fourths, but nearly straight beyond, flexor margin markedly convex except near the base, tibia deepest at the distal three-fourths, length 0.42 (0.395) mm., depth 0.147 (0.145) mm. Tarsus (fig. 3) highly modified, with the flexor margin weakly convex; extensor margin straight in a little more than the basal half, then marked by a deep sinus that extends to the terminal spine; at the proximal end of the sinuation, there are one or two subcylindrical, setae-bearing tubercles; anterior terminal claw stout and strongly curved near the distal third or fourth; posterior claw slender, strongly bent near the middle, with an acute accessory tooth inserted just distal to the point of angulation; tarsus 0.38 (0.37) mm. long, the tarsal spine not being included in the measurement; tarsus with greatest depth 0.136 (0.130) mm. Fourth leg with well-marked spur on coxa, coxal sacs elongated with the lateral half of each with the wall thrown into folds; trochanter 0.32 (0.32) mm. long, 0.185 (0.173) mm. deep; pars basalis subtriangular in shape, 0.25 (0.253) mm. in length, 0.17 (0.155) mm. deep; pars tibialis with extensor margin well rounded, flexor margin nearly straight, 0.67 (0.65) mm. long, 0.27 (0.25) mm. deep; entire femur 0.79 (0.77) mm. long; tibia relatively slender,

flexor margin evenly and gently convex, extensor margin convex in basal third but straight or even a trifle concave beyond, length 0.625 (0.58) mm., depth 0.152 (0.135) mm.; tarsus cylindrical, both margins nearly straight, tarsal claws simple, a tactile seta inserted on the extensor surface 0.33 (0.33) mm. from the proximal margin; tarsus 0.43 (0.43) mm. long, 0.095 (0.097) mm. deep.

Genitalia highly sclerotic; a few scattered setae on the posterior operculum with a group of three stout and peculiarly toothed setae along the rim of the operculum on one side and a group of four on the other side in the holotype, two on one side and three on the other side in the paratype; these grouped setae (fig. 4) of the posterior operculum are distinctly bent near the midpoint where there is inserted a sharp accessory tooth; anterior operculum with a large number of somewhat slender setae, those located near the genital aperture frequently toothed like the setae of the posterior operculum; sclerotic rod of the statumen convolutum appears to be attached at its inner end to the inner end of the margin of the statumen convolutum, rod not reaching beyond the anterior end of the statumen convolutum.

FEMALE: Description based on the allotype only. General body structure as in the male; female 3.7 mm. in length. Carapace as in the male except no keel is present on the posterolateral corner; posterior carapacial margin with 10 setae; carapace 0.98 mm. long, 0.86 mm. wide across the posterior margin, ocular breadth 0.49 mm. Abdomen essentially like that of the male, except the tergal keels are absent and the sternites are much lighter in color; abdomen 2.7 mm. long, 1.4 mm. in width. Chelicera as in the male; rami of galea possibly a little more conspicuous and larger; length of chelicera 0.255 mm., width of base 0.148 mm., length of movable finger 0.19 mm. Palpus from the dorsad as in the male, except that the femur and chela (fig. 5) appear a little stouter; maxilla 0.48 mm. long, 0.30 mm. wide; trochanter 0.52 mm. in length, 0.27 mm. in width; femur 1.05 mm. long, 0.25 mm. wide; tibia 0.90 mm. long, 0.30 mm. wide; chela 1.50 mm. long, 0.43 mm. wide. Chela from the side with marginal teeth and tactile setae distinctly as in the male; length of hand without pedicle 0.84 mm., depth of hand 0.37 mm.; length of movable finger 0.71 mm. Legs of female essentially as in the male, except for the tibia and tarsus of the first leg. First leg with trochanter 0.21 mm. long, 0.152 mm. deep; pars basalis 0.32 mm. long, 0.182 mm. deep; pars tibialis 0.415 mm.



long, 0.167 mm. deep; tibia much more slender than in the male, extensor margin weakly S-shaped, flexor margin evenly convex except at the very base, length of tibia 0.415 mm., depth 0.125 mm.; tarsus subcylindrical, flexor margin virtually straight, extensor margin a little convex, length 0.38 mm., depth 0.098 mm.; tarsal claws without accessory teeth, fairly stout, well curved. Fourth leg virtually as in the male; trochanter 0.34 mm. long, 0.185 mm. deep; pars basalis 0.28 mm. in length, 0.17 mm. in depth; pars tibialis 0.69 mm. in length, 0.27 mm. in depth; entire femur 0.835 mm. long; tibia 0.625 mm. long, 0.145 mm. deep; tarsus with extensor margin a little convex, 0.44 mm. long, 0.105 mm. deep; tactile seta of tarsus removed by 0.355 mm. from the proximal margin; tarsal claws simple. With respect to the genitalia, the middle cribriform plates are subequal in size to the lateral plates; posterior operculum with 14 marginal setae arranged in a single row; anterior operculum with 20 or more hair-like setae along the posterior margin.

TYPE LOCALITY: The male holotype, the female allotype, and one male paratype from Flagstaff, Arizona; April 30, 1936; "lot 36-12." The type specimens are deposited in the American Museum of Natural History.

REMARKS: Although several other species are known in the genus *Hysterochelifer* in the Palearctic region, only two other species are known from North America. From the forms described in the Old World, our species can be separated by the size and the length:width ratios of the palpal podomeres. One European form, *Hysterochelifer gracilimanus* Beier, 1949, apparently should not be assigned to this genus. Its affinities are somewhat doubtful, but it is probably representative of a new genus. One of the North American species is *H. fuscipes* (Banks, 1909) from California. Our form differs from *fuscipes* by having a more slender chela, with the fingers conspicuously shorter than the hand, and by having a much larger body size. The other North American species is *H. geronimoensis* (Chamberlin, 1923) from Lower California. In our species again, the body is larger and the palpal podomeres, especially the chela, are much more slender than in *geronimoensis*.

**PAISOCHELIFER** HOFF, 1946, EMENDED

*Paisochelifer* HOFF, 1946, Bull. Chicago Acad. Sci., vol. 7, p. 487.

DIAGNOSIS EMENDED: Carapace wider than long, almost uni-

formly granular; transverse furrows deeply impressed, the posterior furrow about one-half as far from the posterior carapacial margin as from the median furrow; one pair of eyes. Tergites, including the eleventh, divided; lateral keels of the male wanting or very weakly developed. Cheliceral hand with tactile seta SB either present or absent; in rare instances a supernumerary seta is inserted between B and SB. Flagellar setae of chelicera smooth, not serrate. Setae of movable chelal finger somewhat variable; fixed finger of chela with tactile setae *est* and *ist* proximal to the midpoint of the finger. Coxa of the fourth leg of the male with coxal sac; spur of coxa IV of the male lacking; subterminal setae of the fourth tarsus toothed; tarsus of the first leg of the male without a terminal spine; claws of pedal tarsi, except the first leg of the male, simple; a tactile seta located distal to the midpoint of the fourth pedal tarsus. Statumen convolutum incised anteriorly and containing a sclerotic rod.

GENOTYPE: *Hysterochelifer callus* Hoff, 1945.

REMARKS: The present emendation is made necessary by the inclusion in the genus of a new species, *P. utahensis*, and by the detection of considerable variability in the setae of the cheliceral hand of both *P. callus* and *P. utahensis*.

### ***Paisochelifer callus* (Hoff, 1945)**

*Hysterochelifer callus* HOFF, 1945, Amer. Midland Nat., vol. 34, pp. 515-521.

*Paisochelifer callus* HOFF, 1946, Bull. Chicago Acad. Sci., vol. 7, p. 487; 1949, Bull. Illinois Nat. Hist. Surv., vol. 24, pp. 489-491.

RECORD: One male and one tritonymph from sifting in pine woods, 5 miles east of Salisbury, Maryland, on April 7, 1945. The specimens were submitted for determination by Prof. Martin H. Muma and have been placed in the collections of the American Museum of Natural History.

REMARKS: The present male agrees well with specimens from Illinois, except that the chela is a little stouter while the other palpal podomeres are on the average a trifle more slender in the male from New Jersey. It is possible that a large series of specimens from both New Jersey and Illinois, the type locality, might allow the establishment of a subspecific ranking for the New Jersey specimens, but this is doubtful. The present male is very peculiar since the tactile seta SB is absent from the cheliceral hand. At first it was thought that this would require the establishment of a new genus or subgenus, but since the discovery of

the variability of this seta in *P. utahensis*, as mentioned below, and since the tritonymph of *P. callus* examined had the tactile seta SB missing from one chelicera but present in the other, it is obvious that this seta shows considerable variability. Moreover, a specimen of *P. callus* examined from Illinois shows an extra seta inserted between SB and B on the one chelicera and not on the other. Such variation precludes the use of the tactile setae of the cheliceral hand as criteria upon which to base groupings of either the generic or specific rank.

The male from New Jersey has a body length of 1.85 mm., while the palpal podomeres measure as follows: trochanter 0.30 mm. long, 0.18 mm. wide; femur 0.64 mm. long, 0.175 mm. wide; tibia 0.55 mm. long, 0.21 mm. wide; chela 0.99 mm. long, 0.32 mm. wide; length of hand 0.50 mm., depth of hand 0.27 mm.; movable finger 0.52 mm. in length.

The tritonymph examined has a body length of 1.55 mm. The palpal trochanter is 0.245 mm. long, 0.15 mm. wide; femur 0.46 mm. long, 0.145 mm. wide; tibia 0.38 mm. long, 0.17 mm. wide; chela 0.76 mm. long, 0.245 mm. wide; chelal hand 0.39 mm. long, 0.22 mm. deep; movable finger 0.39 mm. long.

### ***Paisochelifer utahensis*, new species**

Figures 6-9

MALE: Description based on the holotype. Body stout, appendages moderately slender; cephalothorax and palpi golden brown in color, abdomen and legs lighter brown in color; body nearly 3.0 mm. long. Carapace conforming well to the characteristics given for the genus; anterior margin broadly rounded; setae sparse and seldom located on elevated tubercles, short and terminally denticulate, not clavate; six setae along the carapacial margin between the eyes, posterior margin with 10 setae; surface of carapace very conspicuously granulate; carapace 0.85 mm. long, 0.90 mm. wide across the posterior margin; ocular width 0.42 mm. Abdomen ovate in general outline; lateral margins evenly convex; tergites, including the eleventh, divided, conspicuously granulate; virtually no indication of tergal keels; setae of the tergites like those of the carapace, a single marginal row in each tergite with one seta at the lateral margin of each tergal half; most tergal halves with either five or six setae; sternites, including the eleventh, divided, surface of anteriormost

sternal halves marked by net-like lines, becoming granulate like the tergites in the posterior sternal halves; fourth sternite with five or seven setae on each half, usually six or seven marginal setae on each sternal half of rest of abdomen; anterior stigmatic plate without setae, each posterior plate with a single seta; pleural membranes roughly striated; abdomen 2.05 mm. long, 1.13 mm. in greatest width.

Chelicera yellowish brown in color; fairly stout except the fixed finger slender; fixed finger with three denticles on the inner margin of the apical tooth and three well-spaced and strongly developed retroconical denticles on the inner finger margin; movable finger gently curved and with a blunt denticle near the level of the insertion of the galeal seta; apical tooth terminally roughened; galea stout and with five or more short and curved rami confined to the distal one-half; apparently about 16 plates in the serrula exterior but condition of specimen precludes an exact count. Base of chelicera stout, setae as in the genus with IS and LS long and reaching to the end of the fixed finger, acuminate; in one chelicera, seta SB with one or two fine subterminal denticulations; SB wanting from the other chelicera; B with a weak subterminal denticulation; ES acuminate and with a length equal to about two-thirds of the length of IS. Flagellum with setae slender and apparently entire, the middle seta almost as long as the distal seta and the basal seta about two-thirds as long as the distal one; hand with a few net-like markings; chelicera 0.235 mm. long, width of hand not secured; movable finger with length of 0.17 mm.

Palpus (fig. 6) moderately slender; golden in color; surface, except for the chelal fingers, heavily and conspicuously granulate; setae fairly numerous, short, and terminally and subterminally paucidentate, except on the fingers where the investing setae are longer and acuminate. Maxilla 0.39 mm. long, 0.27 mm. wide. Trochanter with a pedicle a little wider than long, a conspicuous and well-rounded dorsal protuberance present, flexor and extensor margins evenly rounded, length 0.445 mm., width 0.23 mm. Femur with a poorly separated pedicle, flexor margin weakly concave, extensor margin almost straight in the center portion but a little convex near the distal end, length 0.965 mm., width 0.21 mm. Tibia with pedicle about as long as wide, well separated from the rest of the podomere along the flexor margin, flexor margin of tibia very weakly convex to almost straight, extensor margin



flatly convex in the center, more convex near each end, tibia widest in the distal one-fourth, length 0.78 mm. long, 0.235 mm. wide. Chela from the dorsad with moderately stout hand, pedicle a very little wider than long and located near the center of the hand; extensor margin of hand evenly and weakly convex; flexor margin less evenly convex than the extensor margin; the hand is somewhat abruptly narrowed just proximad to the base of the fingers; fingers fairly slender and gently curved; chela without pedicle 1.40 mm. long, 0.365 mm. wide; movable finger 0.75 mm. in length. From the side, the hand (fig. 7) appears more slender than in dorsal view; pedicle deeper than long and located near the center of the symmetrically rounded basal margin; ventral margin of hand weakly but evenly convex, the dorsal margin more convex, especially near the center; hand deepest near the center; fingers little curved, inner margin of fixed fingers slightly convex, of movable finger slightly concave; hand 0.72 mm. long, 0.31 mm. deep. Tactile setae of the chelal fingers as shown in the figure. Marginal teeth of fixed chelal finger strongly formed and with well-developed retroconical cusps in the distal half of the finger, teeth becoming in the basal half of the finger acuspid and reduced, to disappear eventually from the basal portion of the finger; the marginal teeth of the movable finger like those of the fixed finger, except that all teeth, with exception of the very distal one, have cusps and the teeth extend almost to the base of the finger, not being gradually reduced proximally as in the fixed finger; a total of 41 teeth on the fixed finger, 47 teeth on the movable finger.

Legs almost yellow in color, sometimes a little golden tinge evident; podomeres granulate on surface, the distal ones becoming almost smooth; setae on the extensor margin of podomeres chiefly short and paucidentate, those of the flexor margin longer and acuminate; claws entire except on the first leg of the male. First leg with trochanter 0.185 mm. long, 0.14 mm. deep; pars basalis club-shaped, 0.28 mm. long, 0.15 mm. deep; pars tibialis subspindle-shaped, both margins evenly convex, deepest near the center, 0.39 mm. long, 0.13 mm. deep; tibia with extensor margin nearly straight except near the proximal end, flexor margin gently convex, deepest at about the distal one-third, 0.37 mm. long, 0.112 mm. deep; tarsus (fig. 8) fusiform, both margins weakly convex, deepest near the center, 0.33 mm. long, 0.095 mm. deep; one tarsal claw of the usual shape, the other

more bent near the center and with a slender and acute accessory tooth located about one-third of the length of the claw from the tip. Fourth leg with trochanter 0.31 mm. long, 0.145 mm. deep; pars basalis subtriangular, 0.21 mm. long, 0.15 mm. deep; pars tibialis with straight flexor margin, extensor margin convex, more convex basally than distally, length 0.57 mm., depth 0.20 mm.; entire femur 0.69 mm. long; tibia very weakly S-shaped, length 0.51 mm., depth 0.115 mm.; tarsus subcylindrical, 0.43 mm. long, 0.085 mm. deep; a tactile seta located on the extensor surface of the tarsus 0.34 mm. from the proximal margin.

Genitalia: statumen convolutum incised anteriorly to contain a sclerotic rod that does not extend anteriorly beyond the incision; anterior operculum very setaceous, being well covered by setae; posterior operculum with few setae, the most conspicuous being a transverse row of five compactly grouped setae on the edge of the operculum to each side of the median line.

FEMALE: Description based on the allotype. Essentially like the male but body, especially the abdomen, lighter in color; body and appendages a little larger; each of the tergal halves usually with six or seven setae; sternite 4 with 10 setae; body 3.15 mm. long; carapace 0.88 mm. long, 0.93 mm. wide across the posterior margin; ocular breadth of the carapace 0.45 mm.; abdomen 2.25 mm. long, 1.5 mm. wide. Chelicera as in the male; number of plates in the serrula exterior estimated as 19 but position precludes an accurate count; tactile seta SB present on both chelicerae; chelicera 0.25 mm. long, 0.156 mm. wide across the base; movable finger 0.20 mm. long. Palpus essentially as in the male, except podomeres slightly larger; both flexor and extensor margins of chela (fig. 9) appear more convex, and the hand is less abruptly narrowed near the base of the finger than in the male; also the extensor and basal margins join in more of a pronounced angle than in the male; side view of chela not obtained since allotype has one chela missing; maxilla 0.45 mm. long, 0.29 mm. wide; trochanter 0.46 mm. long, 0.26 mm. wide; femur 1.06 mm. long, 0.225 mm. wide; tibia 0.85 mm. long, 0.26 mm. wide; chela 1.53 mm. in length, 0.40 mm. in width; length of hand 0.78 mm., length of movable finger 0.80 mm. Tactile setae of the female essentially as in the male. Movable chelal finger with 51 teeth; as near as can be determined, fixed finger with 49 teeth; teeth apparently as in the male. The legs of the female much like those of the male with exception of a slightly larger

size and the difference in shape of the tibia and tarsus of the first leg. First leg of female with trochanter 0.21 mm. long, 0.15 mm. deep; pars basalis 0.305 mm. long, 0.157 mm. deep; pars tibialis 0.42 mm. long, 0.135 mm. deep; tibia a little S-shaped, with the extensor margin somewhat concave, 0.38 mm. long, 0.10 mm. deep; tarsus subcylindrical, more slender than in the male and less deepened near the distal end, margins nearly straight, claws simple, length 0.39 mm., depth 0.081 mm. Fourth leg as in the male; trochanter 0.36 mm. long, 0.178 mm. deep; pars basalis 0.26 mm. long, 0.173 mm. deep; pars tibialis 0.64 mm. long, 0.22 mm. deep; entire femur 0.785 mm. long; tibia 0.55 mm. long, 0.125 mm. deep; tarsus 0.47 mm. long, 0.095 mm. deep; tactile seta inserted on extensor margin 0.37 mm. from the proximal margin of the tarsus. Genitalia of female with the cribriform plates of the median pair about as large in size as the lateral ones; anterior operculum with four setae on the face of the operculum and a few, chiefly broken from the allotype, along the posterior margin of the operculum; posterior operculum with a single row of 10 well-spaced setae.

TYPE LOCALITY: A single male, the holotype, and a single female, the allotype, taken from Utah Lake, Utah, on August 18, 1931. The types are deposited in the American Museum of Natural History.

REMARKS: The only other species known in the genus *Paisochelifer* is the genotype, *P. callus* (Hoff, 1945). The new species differs from the genotype in many ways, including the much larger size of the body and appendages and the definitely more slender palpi.

### ***Levichelifer fulvopalpus* (Hoff, 1946)**

*Idiochelifer fulvopalpus* HOFF, 1946, Amer. Mus. Novitates, no. 1318, p. 23.

*Levichelifer fulvopalpus* HOFF, 1946, Bull. Chicago Acad. Sci., vol. 7, p. 487.

LOCALITY RECORDS: The American Museum collections contain large numbers of this species from Texas: La Joya by L. I. Davis, October 30, 1938; Cameron County by Davis, January to March, 1936; Blackwell, collected by "F. C. B." August 15, 1926; Edinburg, collection taken by "D. M.," April 23, 1938; Rio Grande City, by S. Mulaik, April 29, 1939; Llano County, collected by Davis, July 10-12, 1936; Edinburg, by S. Mulaik, February 5, 1939; Canadian River, 19 miles north of Amarillo, taken by L. I. Davis, July 15, 1939; 10 miles north of Alice, col-

lection made by Mulaik, June 7, 1937; Edinburg, collected by S. Mulaik, December 7, 1935; and great numbers of individuals taken from the nests of pack rats (*Neotoma micropus* Baird) at Laguna Madre, 25 miles southeast of Harlingen, three collections made by D. E. Hardy and one by D. E. Hardy and V. L. Woolley, during May, August, and September, 1945. The Illinois State Natural History Survey collections contain one collection taken in Denton County, Texas, from leaf mold on sandy soil by B. Maxwell, December 28, 1946, and a second collection containing what is tentatively identified as a female of this species and marked simply "Palacios, Mexico; 5-5-38." A collection (AP No. 25517) containing a single male submitted for determination by the Hamilton, Montana, Rocky Mountain Laboratory of the United States Public Health Service was taken by C. B. Philip from a wood rat (*Neotoma* sp.) nest at Silver City, New Mexico, 1938.

REMARKS: The examination of a large series of specimens from Texas indicates that there is considerably more variation in this species than is indicated by the type lot from Reynosa, Tamaulipas, Mexico, a locality just across the international boundary from Texas. The variation to be expected in the males of this species is shown by the following ranges of measurements of palpal podomeres secured by combining the measurements of the original lot of five type specimens from Mexico with 10 additional individuals from Texas. The ranges are as follows: palpal femur 0.79–0.93 mm. long, 0.17–0.20 mm. wide, length 4.4 to 5.0 times the width; palpal tibia 0.72–0.83 mm. long, 0.195–0.245 mm. wide, length 3.3 to 3.8 times the width; chela 1.20–1.38 mm. in length, 0.28–0.36 mm. in width, length 3.7 to 4.4 times the width; depth of chelal hand 0.255–0.32 mm.; length of chelal hand 0.57–0.67 mm.; length of movable chelal finger 0.67–0.75 mm. While the actual sizes of the palpal podomeres of the female are larger than in the male, the same relative amount of variation is obvious. Besides variation in size of the palpal podomeres, other structures of the male are also somewhat variable. For instance, it is often difficult to see the sclerotic rod in the statumen convolutum because of its small size and somewhat hidden position, and, in other instances, the accessory tooth appears to be much reduced and even absent from the posterior claw of the first leg of the male.

The single individual male from New Mexico has the palpal



podomeres slightly more slender than in the majority of specimens from Texas, but this individual is certainly conspecific with the material from Texas and Mexico. Palpal podomeres of the male from New Mexico measure as follows: femur 0.86 mm. long, 0.17 mm. wide; tibia 0.74 mm. long, 0.20 mm. wide; chela 1.21 mm. in length, 0.27 mm. in width; chelal hand with depth of 0.25 mm., length of 0.57 mm.; movable finger 0.70 mm. in length.

Among the collections of the American Museum of Natural History were found a single female and one deutonymph of what appears to be a new species of *Levichelifer* collected by A. F. Archer, on January 17, 1941, from Jackson Oak, Baldwin County, Alabama. Since no males are present and it is impossible to make a certain generic assignment, I believe it advisable not to describe this form as new at the present time. If this form is, as it appears to be, congeneric with *fulvopalpus*, then it is certainly new to the literature.

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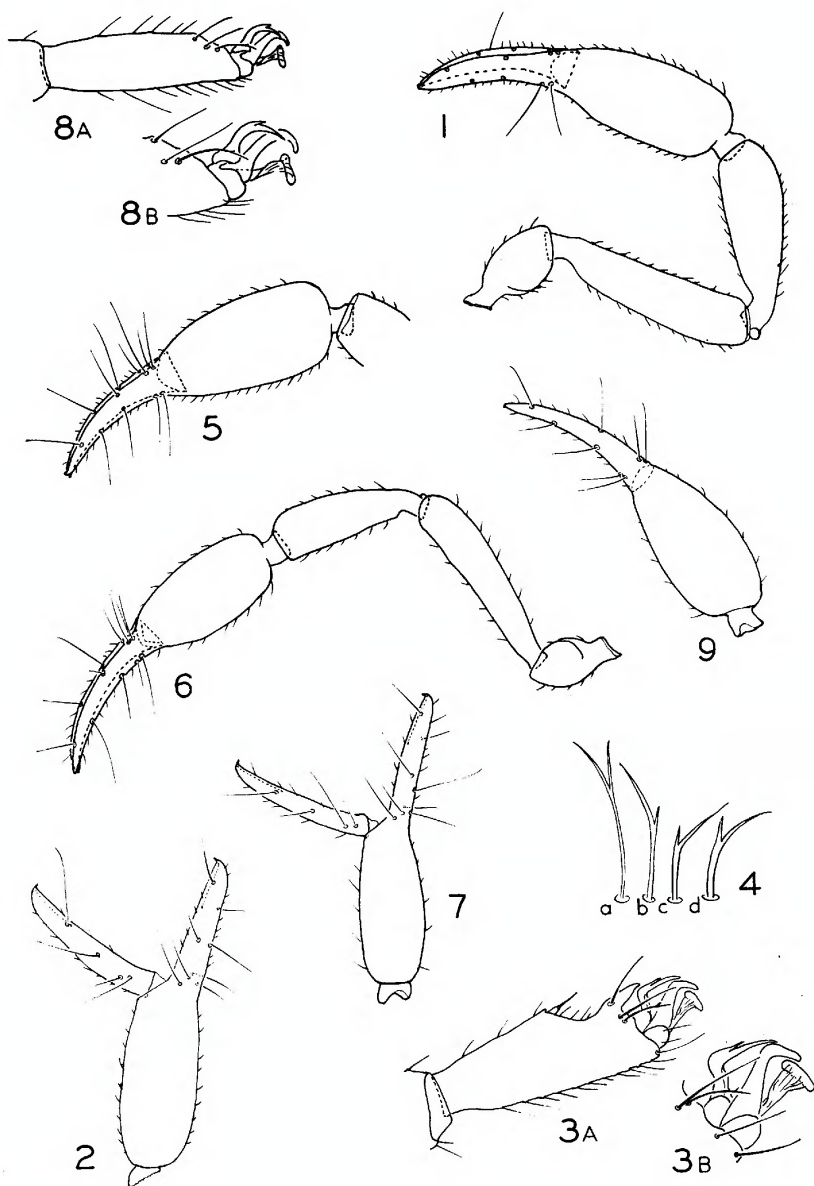
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FIGS. 1-5. *Hysterochelifer proprius*, new species. 1. Dorsal view of palp, male holotype. 2. Lateral view of chela, male holotype. 3A. Tarsus of first leg, male holotype. 3B. Terminal claws of tarsus of first leg, male holotype. 4. Setae of genital opercula, male holotype; *a* and *b* from anterior operculum, *c* and *d* from posterior operculum. 5. Dorsal view of palpal chela, female allotype.

FIGS. 6-9. *Paisochelifer utahensis*, new species. 6. Dorsal view of palp, male holotype. 7. Lateral view of chela, male holotype. 8A. Tarsus of first leg, male holotype. 8B. Terminal claws of tarsus of first leg, male holotype. 9. Dorsal view of palpal chela, movable finger wanting, female allotype.